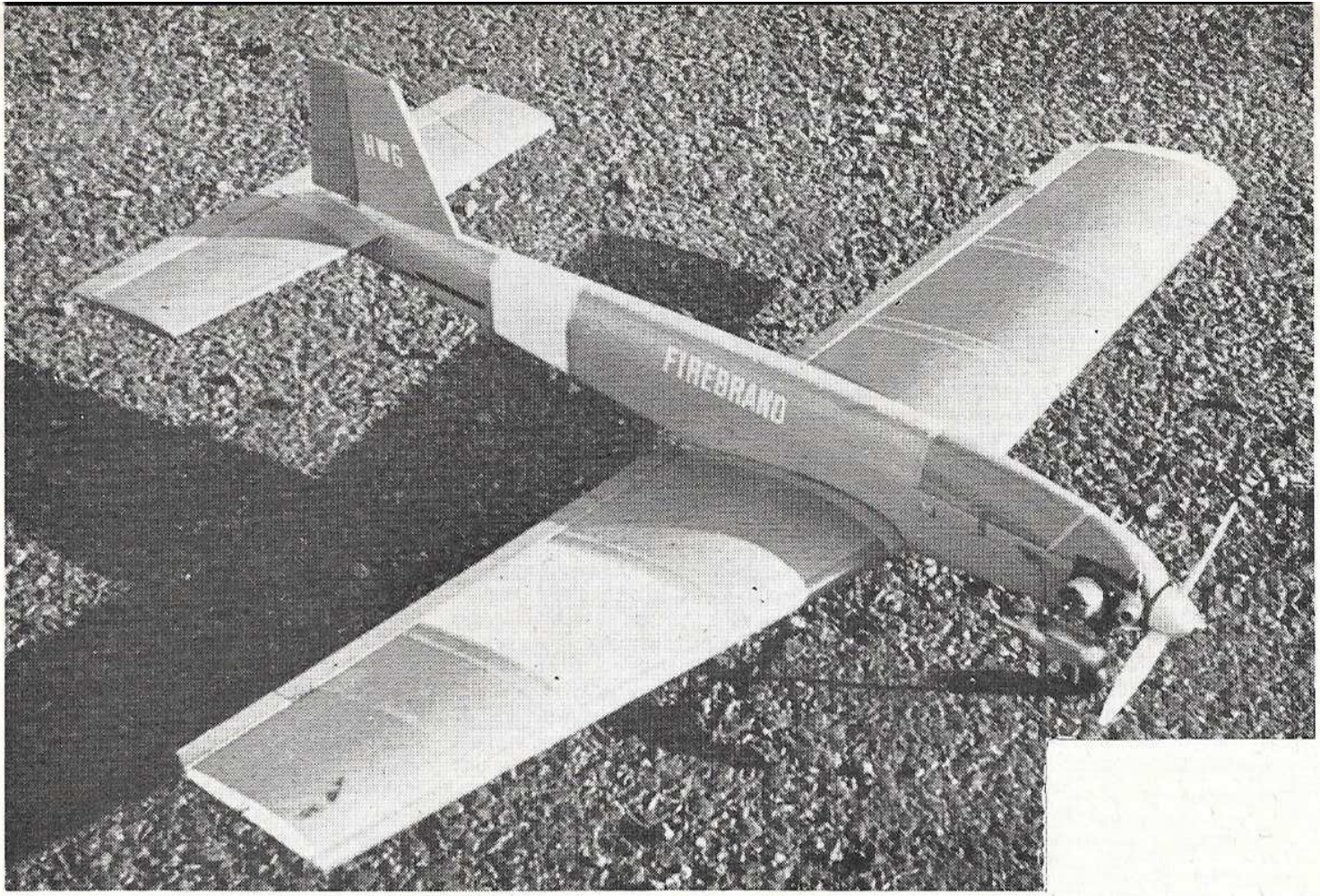


THE FIREBRAND'S design and construction history is rather a chequered one. It started life in the spring of 1972 on the drawing board as a full-size felt-pen sketch with a conventional fuselage and upright engine. In this configuration construction was started—and then stopped, with the wings finished and the fuselage half assembled. In the late summer of 1972 it was rescued from the corner of the modelling room and redesigned to its present configuration. After being finished I installed my radio gear, and due to lack of flying time it again went into storage.

Firebrand finally left the runway in February 1973 but, by this time, I was in the middle of a " conversion course " from single-stick (L.H. throttle) to two-stick flying, so I handed over the " tranny " to clubmate Alf Beckham for her first flight. After one flight to trim out, Alf took her up on the second flight and flew through the F.A.I. Schedule. After some dozen flights the model was withdrawn from service, a few minor mods made and some new O.S. DP.4P Cougar gear installed. Since that first flight *Firebrand* has now had over 100 flights, including completing my conversion to two-stick.

The prototype has done nearly all its flying fitted with an OS H40 lapped piston motor—which was built from two old ones—and for all-round flying a 10 × 6 Tornado prop has been found most suited to this combination.

The handling characteristics are very good at all speeds and in particular its inverted handling is extremely groovy. The slow speed is really slow—you can almost walk alongside and adjust the needle. On landing approaches, typical of smaller models, allow a long approach for the machine to slow up but, if you like to do " greasers," she will stick down like glue at even quite high speed.

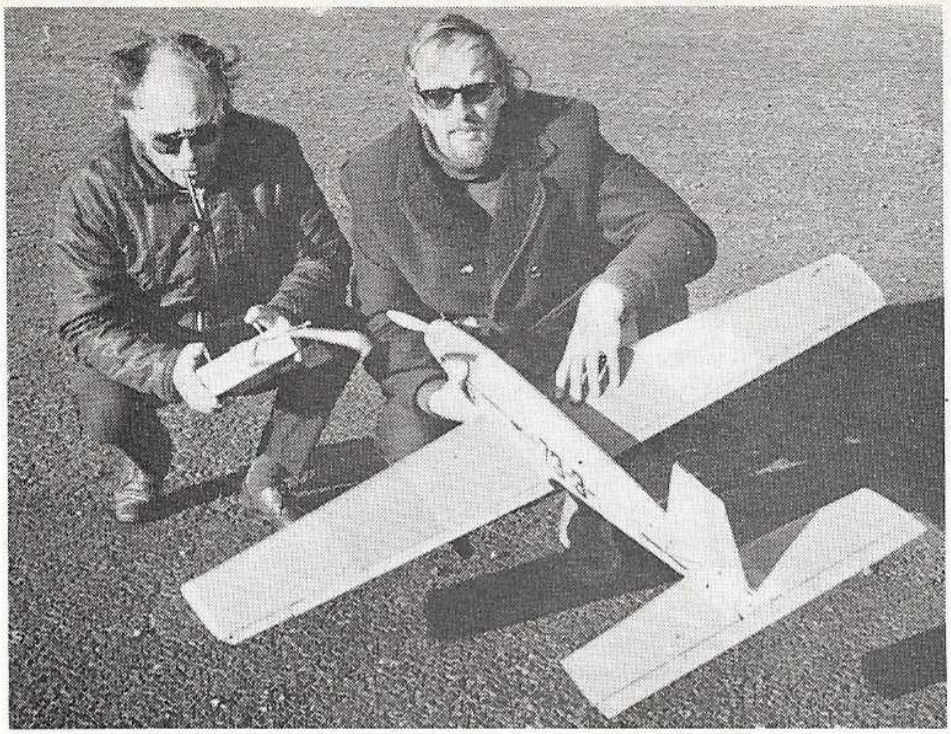
In our flying group's fun contests the *Firebrand* has turned in 2.15 glide in a 30 sec. engine run, and also won the open pylon over a 10 lap triangular course of nearly four miles at over 70 m.p.h.—this was done whilst running in a new '73 OS 40 with the motor being almost peaked for the first time, with a 10 × 6 Tornado.

So this is the *Firebrand*—a design which will give you a good 40 size Club aerobatic machine or, for the Sunday flyer who likes to stooge around, a good 35 would no doubt be ample. With a hot 40 and a 9 × 7 or 9 × 8 the *Firebrand* really comes into its own for free-style aerobatic/demonstration flying, including pulling top hats on half throttle (at a fueled weight of around $4\frac{3}{4}$lb.).

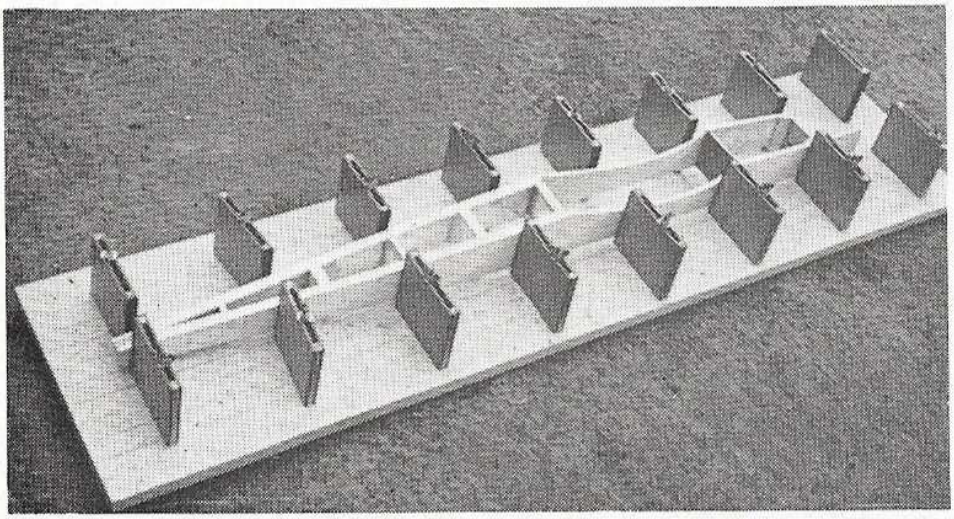
CONSTRUCTION

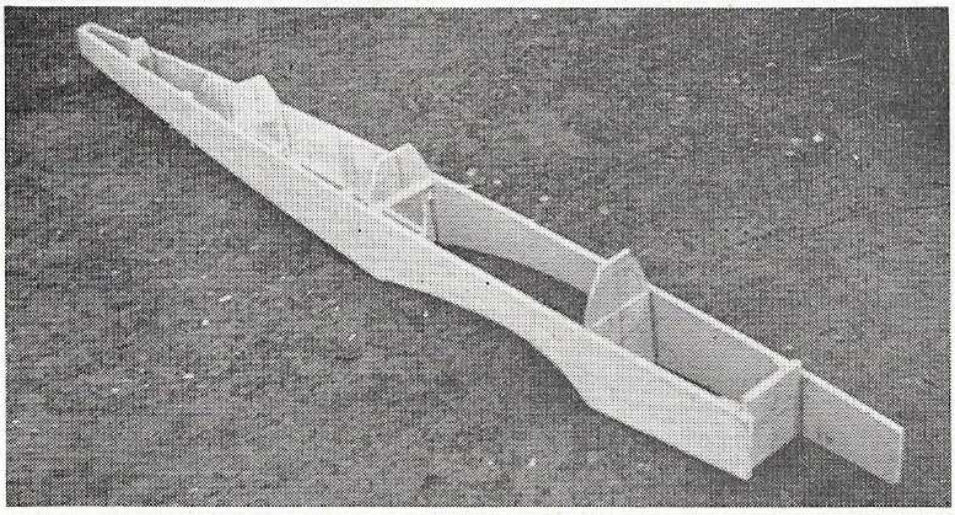
Fuselage

Begin by cutting both fuselage sides from medium hard $\frac{3}{16}$ in. sheet, making both sides full length (right side is cut away after assembly—see notes on engine installation). Add



Above: designer and clubmate on their home strip, ready for another session. Below: not essential, of course, but a fuselage jig certainly ensures a true job.





ply doublers, balsa tail doublers and $\frac{3}{16}$in. dummy longerons and uprights; these are cut from scrap $\frac{3}{16}$in. sheet from the fuselage sides. Cut all formers out and drill engine mounting holes in F1 together with fuel feed and throttle linkage holes. Temporarily bolt engine mount to F1 before assembling fuselage parts. Prototype used Micro Mold nylon mount, shortened forward of engine mounting lugs. Fit 6 BA screws to mounting and make captive by soldering wire across the heads. After assembling the fuselage sides and formers, add the upper sides, making these oversize; when dry trim down and sand top edges to take the $\frac{3}{8}$in. top. Finish the fuselage assembly by adding the tank bay bottom and nose block over the engine—note the slot to fit over F1. Spot glue the dummy canopy (tank hatch) and tail blocks in position.

Engine installation

Cut away right hand side of the fuselage, making this opening just big enough to fit motor to its mounting, and give box spanner access to 6 BA mounting nuts.

Block in around the motor and mounting and add the ply nose, locating the latter from the spinner. Carve the fuselage section as shown on plan, and finish ready for covering.

Nose leg

On the prototype, the 8 swg ($\frac{5}{32}$in. diam.) nose leg is fitted in a slot carefully cut and filed in the back of the nylon engine mounting and retained by wire clip under the tiller arm—the wire clips being screwed to the ply reinforcement under the nose.

Aileron linkage

Before starting on the wing structure it is necessary to decide which type of linkage you will be using. This is really dependent on the size of equipment, and your finesse at installing it. The original *Firebrand* used plastic tube type links (Kavan) with the rudder and elevator servos mounted to the rear, and above the wing, and an access hatch directly behind the wing on the bottom of the fuselage. I think, on reflection, the outboard bellcrank type of linkage would be a better all round proposition. Regarding aileron movement, remember when fitting the linkage, that a slight amount of differential is required with this wing section—*i.e.* more up than down—to give clean axial rolls.

Wings

The built-up wing is straightforward and is built upside down on board, with the t.e. packed up. If you decide to use bellcrank linkage for aileron don't forget to cut minimum sized holes for 16 swg operating rod. Mount the bellcranks on $\frac{3}{32}$in. or $\frac{1}{8}$in. ply platforms positioned at $\frac{1}{2}$ span. Ribs are made by the " sandwich " method. Note $\frac{3}{16}$in. centre ribs are made separately, using the wing seat from the fuselage side.

Tailplane

Fin, rudder and elevator are of straightforward construction and only require carving and sanding. The stabiliser is built up as follows:

Butt joint sheet and pin packing l.e. and t.e. to plan, place the bottom skin in position and pin the ribs in place to push down the sheeting between the packing, allow to dry, remove from board and add top—weight down onto packing pieces whilst drying. All ribs are made to root templates and trimmed to fit by sanding forward of maximum depths.—Line " A " on tail plan.

Radio installation

On the original *Firebrand* the gear is installed with the rudder and elevator servos behind the wing, positioned to clear centre aileron horns and also to get the c.g. correct. The receiver and also the throttle servo (which is taped in) are at the forward end of the compartment and the battery pack is in the top of the fuselage. The pack is held up by a ply plate fitted into rails glued to the fuselage sides which not only support the battery but also protect the plugs and wires from the aileron push rods, and keep things tidy.

Due to the sweepback of the geometric chord, the nose is longer than it appears, so don't worry if you find it is necessary to mount the R. & E. servos behind the wing. With an OS H40 up front the c.g. was still slightly forward of the required position. (A change from the tail-heavy condition I usually seem to get!)

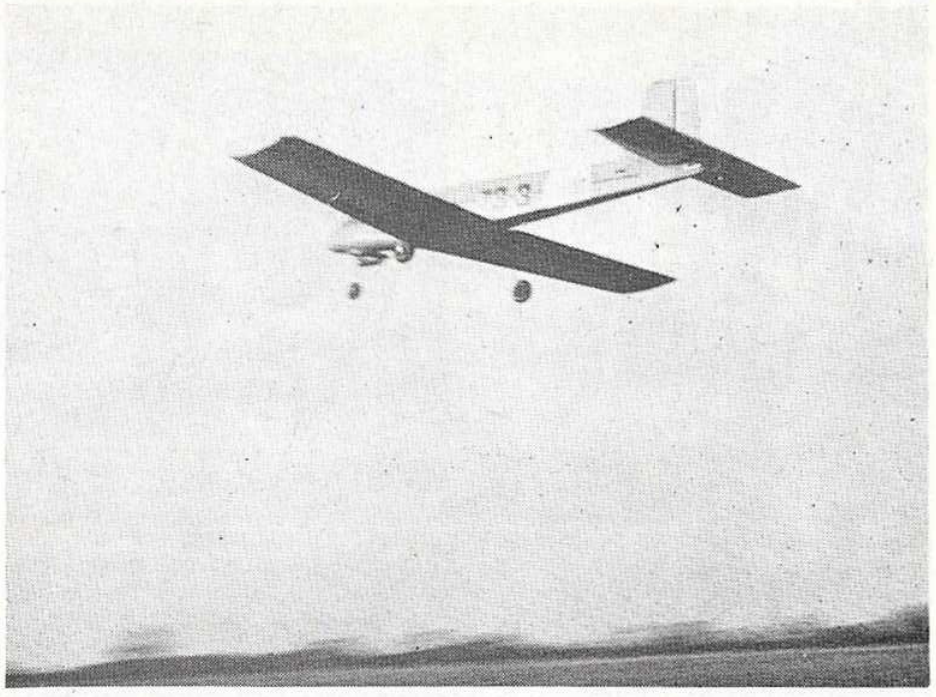
Finish

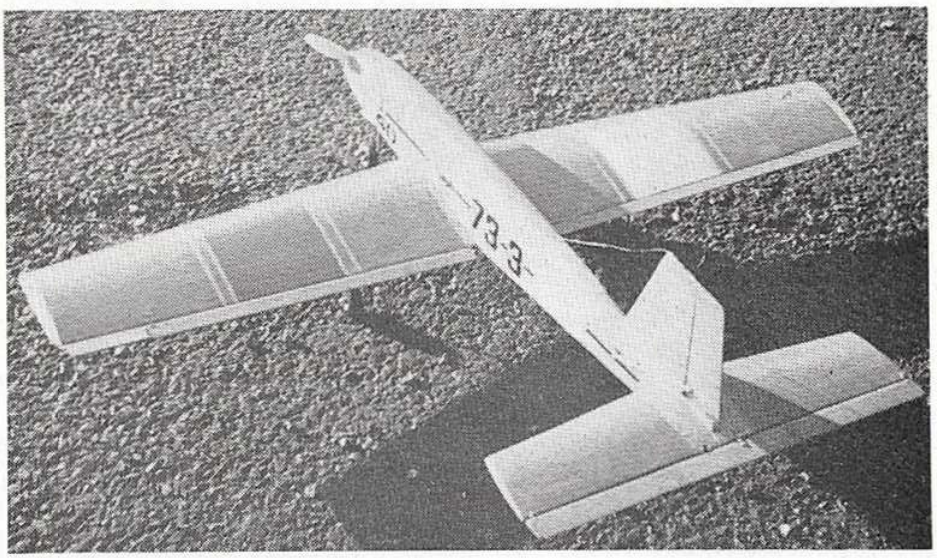
Surfaces are hinged with .003in. Mylar and figure-eight stitching at root and tip. My *Firebrand* is finished with orange heavy-weight Modelspan all over, given several coats of clear dope. The wings and tail are left " tissue colour " and given two coats of PU15 outdoor gloss clear polyurethane. The fuselage and fin and rudder are orange Kingston Diamond gloss.

Trim is grey on top and l.e. of wing and white underneath. Hot fuel proof the engine bay, tank bay and radio compartment around the wing seat.

Setting up and flying

Balance the model so as to have the c.g. as shown on the plan, which is ideal for sports and general flying. For full schedule flying *gradually* move the c.g. back until the model will spin—recovery is hands off. As mentioned, the ailerons need a slight amount of differential and not too much movement to start with, please—the aileron control is very positive. Due to the wing section you will also





FIREBRAND

need more down elevator movement than up. Like the ailerons the elevator response is very positive, but not jumpy. Rudder throw should be maximum obtainable, but the nose-wheel only a few degrees. Most modellers seem to forget about the nose wheel throw and just hook up like it's a rudder, and then tack down the runway—a la Cowes week!

Using a 40 (on a 10 × 6 Tornado or a 9 × 7 Super) with the correct undercarriage angle, the *Firebrand* will unstick with very slight stick pressure, and climb "up, up and away" at 45°, the limit of climb usually being cloud-base or your eyesight!

The original model took some dozen flights before I was reasonably satisfied with the trim—especially the engine thrust and elevator/aileron differentials, so don't just fly around with your trim levers all over the place—remember that a R/C model needs just as much patient trimming as a free-flighter. Properly trimmed, *i.e.* hands off, straight and level and not turning, the *Firebrand* will knife-edge with ease.

As you will gather, I like the *Firebrand*—even though I am biased—and so do others who have flown it—so clear the building board and get cracking. I hope it rewards you with as much pleasure and fun as I have had from the prototype.